

## **AMENDMENTS TO THE CLAIMS:**

Claims 1-53 are presently pending in this application. Claims 1 and 5-8 are amended and claims 22-53 are added herein. This listing of claims will replace all prior versions, and listings of claims, in the application.

## **LISTING OF CLAIMS:**

1. (Currently amended) A nucleic acid primer having a 5' end and a 3' end, comprising:
  - (a) a first region containing the 5' end of the primer and an immobilization attachment site; and
  - (b) a second region containing the 3' end of the primer including a free 3' hydroxyl and a selectively chemically cleavable site, ~~wherein~~ wherein:

the 3' end is capable of being extended by an enzyme to generate an extension segment, whereby, when the primer is immobilized via the immobilization attachment site, and the selectively chemically cleavable site is cleaved, the remainder of the primer remains immobilized; and

the selectively chemically cleavable site comprises a modified sugar or a chemically cleavable group incorporated into the phosphate backbone.
2. (Previously presented) The primer of claim 1, wherein the selectively chemically cleavable site is located at or within about five nucleotides from the 3' end of the primer.
3. (Original) The primer of claim 2, wherein the second region of the primer comprises a single nucleotide.
4. (Original) The primer of claim 3, wherein the second region comprises a ribonucleotide.
5. (Currently amended) The primer of claim 1, wherein the selectively chemically cleavable site comprises ~~a modified base, a modified sugar, or~~ a chemically cleavable group incorporated into the phosphate backbone.
6. (Currently amended) The primer of claim ~~[[5]]~~ 1, wherein the selectively chemically cleavable site comprises a modified sugar.

7. (Currently amended) The primer of claim 1, where the selectively chemically cleavable site group is selected from the group consisting of dialkoxysilane, 3'-(S)-phosphorothioate, 5'-(S)-phosphorothioate, 3'-(N)-phosphoramidate, 5'-(N)-phosphoramidate, uracil, and ribose.

8. (Currently amended) The primer of claim 7, wherein the selectively chemically cleavable site group is 3'-(S)-phosphorothioate or 5'-(S)-phosphorothioate.

9. (Original) The primer of claim 1, wherein the enzyme is a DNA polymerase.

10. (Original) The primer of claim 1, wherein the enzyme is a ligase.

11. (Original) The primer of claim 1, further comprising a solid support attached to the immobilization attachment site.

12. (Original) The primer of claim 11, wherein the immobilization attachment site is attached to an intervening spacer arm bound to the solid support.

13. (Original) The primer of claim 12, wherein the intervening spacer arm is six or more atoms in length.

14. (Original) The primer of claim 11, wherein the solid support is selected from the group consisting of glass, silicon, polystyrene, aluminum, steel, iron, copper, nickel, silver and gold.

15. (Original) The primer of claim 11, wherein the solid support comprises a functionality selected from the group of avidin and streptavidin.

16. (Original) The primer of claim 11, wherein the solid support comprises an antibody.

17. (Original) The primer of claim 16, wherein the antibody comprises anti-digoxigenin.

18. (Original) The primer of claim 1, wherein the immobilization attachment site is a substituent on one of the bases or sugars of the primer.

19. (Original) The primer of claim 1, wherein the immobilization attachment site is biotin or digoxigenin.

20. (Original) The primer of claim 1, wherein the immobilization attachment site comprises a single-stranded nucleic acid.

21. (Original) The primer of claim 20, further comprising a solid support, wherein the single stranded nucleic acid is complementary to an intermediary oligonucleotide bound to the solid support and wherein the primer is attached to the solid support by hybridization of the immobilization attachment site to the intermediary oligonucleotide.

22. (New) The primer of claim 5, wherein the chemically cleavable group incorporated into the phosphate backbone is selected from the group consisting of dialkoxysilane;  $\beta$ -cyano ether; 5'-deoxy-5'-aminocarbamate; 3'-deoxy-3'-aminocarbamate; urea; 2'-cyano-3',5'-phospho-diester; 3'-(S)-phosphorothioate; 5'-(S)-phosphorothioate; 3'-(N)-phosphoramidate; 5'-(N)-phosphoramidate;  $\alpha$ -amino amide; vicinal diol; ribonucleoside; 2'-amino-3',5'-phosphodiester; allylic sulfoxide; ester; silyl ether; dithioacetal; 5'-thio-formal;  $\alpha$ -hydroxy-methyl-phosphonic bisamide; acetal; and 3'-thio-formal.

23. (New) A nucleic acid primer having a 5' end and a 3' end, comprising:

(a) a first region containing the 5' end of the primer and an internal immobilization attachment site; and

(b) a second region containing the 3' end of the primer including a free 3' hydroxyl and a selectively chemically cleavable site that connects the first and second primer regions, wherein:

the 3' end is capable of being extended by an enzyme to generate an extension segment; and

when the primer is immobilized via the immobilization attachment site, the immobilized primer is in a branched configuration.

24. (New) The primer of claim 23, wherein the immobilization attachment site is a substituent on one of the bases or sugars of the primer.

25. (New) The primer of claim 23, wherein the immobilization attachment site is biotin or digoxigenin.

26. (New) The primer of claim 23, wherein the immobilization attachment site comprises a single-stranded nucleic acid.

27. (New) The primer of claim 23, wherein the immobilization attachment site is attached to an intervening spacer arm bound to the solid support.

28. (New) The primer of claim 27, wherein the intervening spacer arm is six or more atoms in length.

29. (New) The primer of claim 23, wherein the solid support is selected from the group consisting of glass, silicon, polystyrene, aluminum, steel, iron, copper, nickel, silver and gold.

30. (New) The primer of claim 23, wherein the solid support comprises a functionality selected from the group of avidin and streptavidin.

31. (New) The primer of claim 23, wherein the solid support comprises an antibody.

32. (New) The primer of claim 31, wherein the antibody comprises anti-digoxigenin.

33. (New) A nucleic acid primer having a 5' end and a 3' end, comprising:

(a) a first region containing the 5' end of the primer and primer, an immobilization attachment site and one or more secondary cleavable sites; and

(b) a second region containing the 3' end of the primer including a free 3' hydroxyl and a primary cleavable site, wherein the 3' end is capable of being extended by an enzyme to generate an extension segment.

34. (New) The primer of claim 33, wherein the primary cleavable site is located at or within about five nucleotides from the 3' end of the primer.

35. (New) The primer of claim 33, wherein the second region of the primer comprises a single nucleotide.

36. (New) The primer of claim 35, wherein the second region comprises a ribonucleotide.

37. (New) The primer of claim 33, wherein the primary cleavable site comprises a modified base, a modified sugar, or a chemically cleavable group incorporated into the phosphate backbone.

38. (New) The primer of claim 37, wherein the primary cleavable site comprises a modified sugar.

39. (New) The primer of claim 33, where the primary cleavable site is selected from the group consisting of dialkoxysilane, 3'-(S)-phosphorothioate, 5'-(S)-phosphorothioate, 3'-(N)-phosphoramidate, 5'-(N)-phosphoramidate, uracil, and ribose.

40. (New) The primer of claim 39, wherein the primary cleavable site is 3'-(S)-phosphorothioate or 5'-(S)-phosphorothioate.

41. (New) The primer of claim 33, wherein the one or more secondary cleavable sites comprises a modified base, a modified sugar, or a chemically cleavable group incorporated into the phosphate backbone.

42. (New) The primer of claim 41, wherein the one or more secondary cleavable sites comprises a modified sugar.

43. (New) The primer of claim 33, where the one or more secondary cleavable sites is selected from the group consisting of dialkoxysilane, 3'-(S)-phosphorothioate, 5'-(S)-phosphorothioate, 3'-(N)-phosphoramidate, 5'-(N)-phosphoramidate, uracil, and ribose.

44. (New) The primer of claim 43, wherein the one or more secondary cleavable sites is 3'-(S)-phosphorothioate or 5'-(S)-phosphorothioate.

45. (New) The primer of claim 33, wherein the immobilization attachment site is a substituent on one of the bases or sugars of the primer.

46. (New) The primer of claim 33, wherein the immobilization attachment site comprises a single-stranded nucleic acid.

47. (New) The primer of claim 33, wherein the immobilization attachment site is biotin or digoxigenin.

48. (New) The primer of claim 33, further comprising a solid support attached to the immobilization attachment site.

49. (New) The primer of claim 48, wherein the immobilization attachment site is attached to an intervening spacer arm bound to the solid support.

50. (New) The primer of claim 33, wherein the solid support is selected from the group consisting of glass, silicon, polystyrene, aluminum, steel, iron, copper, nickel, silver and gold.

51. (New) The primer of claim 33, wherein the solid support comprises a functionality selected from the group of avidin and streptavidin.

52. (New) The primer of claim 33, wherein the solid support comprises an antibody.

53. (New) The primer of claim 52, wherein the antibody comprises anti-digoxigenin.